

orange, will nearly do. If these two last be made to partially overlap the effect is very striking.
Swansea, May 6

WM. TERRILL

The Araucaria

IN your first number for March last you express your surprise that we should still be ignorant regarding some important phases of salmon life; but there is a question relating to facts much more within the sphere of our daily observation on which authorities differ as much. Does the common *Araucaria* (*A. imbricata*) require one year or two for the growth of a shoot on the main stem, estimating a shoot as the growth between two whorls of branches? Every gardener whom I have consulted on the subject in Scotland, from north to south, says positively that it requires two years, while the few of whom I have had any opportunity of inquiring in the south of England, decide equally positively in favour of one year. Prof. Balfour agrees with the former in as far as Scotland is concerned, while a gentleman residing on the border between the two countries, informs me that some of his have grown at the rate of a shoot in two years, others of a shoot annually, while a few show only a shoot for every year and a half since they were planted. It has been suggested to me that the difference, if it really exist, may be due to the more favourable climate of England; but *araucarias* may be seen growing as freely and as healthily in Ross-shire as in Kew Gardens. It would be satisfactory to have more general information on the subject from England and from the Continent of Europe, and still better to have it from the native countries of the tree.

There is another question equally important regarding it, namely, when the shoots are biennial, as they undoubtedly are in many cases, is there a timber ring in the stem for every year's growth, or one for every whorl of branches? On that point also the evidence is contradictory.

JAMES ELLIOT

The Hibernation of Swallows

IN connection with the Duke of Argyll's letter on this subject (*NATURE*, vol. xv. p. 527) there is an interesting communication in the *Ornithologisches Centralblatt* of May 1 from Herr J. Rohweder, under the head of "Ornithological Notes from Schleswig-Holstein." Herr Rohweder certifies to the competency and trustworthiness of the observer who communicated the facts to him. After the house-swallows (*Hirundo urbica*) in the autumn of 1870, from the beginning to the middle of September, had held their usual assemblies by hundreds on the sunny side of the roofs, stormy and rainy cold weather suddenly supervened. As suddenly did most of the swallows take their departure for the south. The few that remained behind flew about restlessly and anxiously, unable in the cold north wind to obtain sufficient insects to appease their hunger. Within a day after the others these also disappeared. Three days after, during which time no swallow was observed, Herr Rohweder's informant saw peeping out of the entrance of some nests under the projecting roof of the east side of his house, here a wing, there a tail or a few feathers. A ladder was obtained and the nests tapped, but no motion. On pulling at one of the overhanging wings a swallow was dragged out. It was alive, but seemed paralysed. After the swallow was held in the hand a while it fluttered about a short space and then fell to the earth. A second bird behaved in the same way, and a third showed few signs of life. A fourth appeared quite lifeless. In other nests six, and ten, and even fourteen swallows were found huddled together. Their condition was similar to those first found. The birds near the entrance of the nest appeared in a state of sound sleep, while those further in showed no signs of life. The former soon were able to fly, with difficulty, a larger or shorter round, only one flying to a considerable distance; the latter were thrown on a neighbouring heap of straw. On the following day, when the observer returned, no birds were found. The exact locality of these observations is not given.

X.

Two Remarkable Meteors

WHILST walking on Sunday night with a friend, about 10:35 my attention was directed to a beautiful meteor, of a ruddy hue, not unlike Mars. It appeared a little to the south of Arcturus,

and after passing along with a slow motion in an easterly direction, throwing out sparks meanwhile, disappeared near β Herculis. In size it seemed to be about four times as large as Jupiter, and continued visible for three or four seconds. About half a minute afterwards it was followed by another from the same quarter, which took almost exactly the same direction as the other. In colour and appearance it resembled the first, but was not quite so large. It remained visible about three seconds. The sky at the time was beautifully clear, and there was little or no wind.

Rottingdean, Brighton, May 14

W. H. S. J. HOPE

Yellow Crocuses

(Translation)

I have observed here that sparrows have shown a very considerable partiality for yellow crocuses during this spring. My neighbour and I vied with each other in our spring beds; he excelled in yellow crocuses and hyacinths, I in white and blue crocuses. One beautiful Sunday the whole of his crocuses were found bitten and torn by sparrows, and, what is noteworthy, also some yellow crocuses which had somehow wandered into my lot, while the blue and white remained almost untouched. Should this be regarded as an oversight, or was it a matter of taste?

So far the fact is incontestable, but it has not before been observed by me, though I am an old amateur. To be sure, for the last six years, I have always been, about the time of blooming, absent at the Reichstag, and perhaps, therefore, have forgotten early single observations. It may not be possible to obtain a positive explanation. The dryness of the spring, perhaps the colour-sense of the bird, or even a more or less delicate mixture of the plant-sap may account for it—quien sabe!

Hamburg, May 12

W. VON FREEDEN
Editor of the *Hansa*

Sound and Light

I SHOULD like to learn if the following phenomenon is well known and alluded to in scientific writings. While lying awake a few mornings ago, with my eyelids closed, I was startled by a railway whistle. At the same instant I perceived a blaze of light on a dark ground seemingly a few yards off. I made inquiry of my wife (who is of a much more nervous temperament than I) if she had ever observed such a coincidence, and was informed that in her case it is not a very unfrequent occurrence. I likewise reported the circumstance to some scientific friends, but they had neither read nor heard of noise being the occasioning cause of sensation of colour.

While the pen is in my hand I may mention, in reference to Mr. Renshaw's communication (p. 530), that sparrows are in the habit of demolishing the flowers of my yellow crocuses.

Bushy Hill, Cambslang

HENRY MUIRHEAD

Cloud Colours

A VEIN of thought is sometimes as a vein of the most fine gold, and observation is everything in meteorology as it is in geology, in which two difficult sciences we are much interested in this country, and of which your contributor is the unpretending student.

Now I first learned my lessons in weather science from the remarks of Admiral Fitzroy, the author of the *Weather Book*, which should be well known and read in this country. For years we have marked what an intimate correlation there is between the colour of the clouds and coming weather. Thus we have the cold dark blue and grey, and the reddish yellow masses of cloud as indicative of cold and snow, and we have the light bright grey with bright edges as accompanying or indicating hard frost. Then again we have the inky-coloured cloud, flying in shreds, as indicative of wind and rain, and also the mottled cloud of the same colour or thereabouts, as the sure indicative of rain. We have the sickly-looking green, the deep blue gloom, the muddy angry-looking red, and other such tints, as forecasts of storm, snow, rain, &c.; and frequently before a north-easter we have the grey bluish and whitish clouds setting from north-east, somewhat like the spread-out fingers of the hand. Our sunsets are often grand beyond my pen. The lavish wealth of crimson and gold is magnificent. It strikes us now to ask what relation chemistry and gases have with the cloud colours. I leave that

to older minds than mine, beyond the banks of Newfoundland.

But we see, from all that has been said, the vast importance of noting the *colours* of the clouds. We depend much in this country on the colour of the clouds for weather prediction. Ice, however, at this time of year, by refrigerating the atmosphere, often interferes with calculation.

Hailer Grace, Newfoundland

H. C.

THE PROGRESS OF EVOLUTION*

THE new journal mentioned below is edited jointly by Dr. Otto Caspari, of Heidelberg, Prof. Dr. Gustav Jäger, of Stuttgart, and Dr. Ernst Krause (Carus Sterne), of Berlin; and on the list of its contributors are the names of Charles Darwin, Ernst Haeckel, Friedrich von Hellwald, and many others whose scientific creed is Darwinism.

The editors in their introductory statement say that a new day has dawned for natural science, since our great countryman applied the natural laws which govern the whole universe to the phenomena of the development of life, and showed the fallacy of assigning that central position in nature to man himself which had been attributed to him for ages, as Copernicus did in the case of our planet three centuries ago. Man, who seemed to stand above nature hitherto has, without being drawn down from his eminent position, been incorporated with nature as one of her integral parts. The new monistic philosophy caused a wonderful reaction, and an animated reciprocal intercourse arose between the subjective and objective sciences. All the sciences which treat of man, from anthropology, ethnology, and the psychology of peoples, to the history of culture and states, national economy, the philosophy of law, history, and religion, and the sciences of morals and dietetics, proved to be natural sciences quite as much as mineralogy, biology, the practical education of man, and the cultivation of plants and animals.

The result of this general intercourse of the different sciences, has been a continued and encouraging confirmation of the monistic principle contained in the theories of descent and development; the literature, however, which was generated by the reaction, is dispersed and can be collected only from the various scientific journals. Thus, a general desire for collection and concentration has sprung up amongst all those who look upon the theory of development as a considerable progress of the human mind.

The new *Kosmos* will bring together what has hitherto been unconnected; will point out the gaps still existing, and thus lead to their being speedily filled; will reduce contrasts and contradictions to their true nature, and will oppose pernicious dogmatism. *Kosmos* will, with regard to the special domains of natural science, bear a certain critical and polemical stamp, its editors being aware that even science is best developed and strengthened in the fight for its existence, and that in the end the "fittest" theory will survive. All articles in the new serial are written in popular language, and are intended for a large circle of readers.

The first number contains a series of very interesting articles, of which we may mention—Philosophy and its Union with Natural Science, by Otto Caspari; On Inheritance, by Dr. Gustav Jäger; On Modern Anthropology, by the same; On the Chronicles of the History of Development, by Ernst Haeckel; The History of Creation and Chorology two Centuries ago, by Carus Sterne; On the Significance and Objects of Ethnography, by Friedrich von Hellwald; and an excellent review of Darwin's work on Cross and Self-Fertilisation, by Dr. Hermann Müller.

* *Kosmos*; Zeitschrift für einheitliche Weltanschauung auf Grund der Entwicklungslehre. (1 Heft, April, 1877.)

ENGINEERING EDUCATION IN JAPAN

THE technical education of engineers is a subject which has engaged public attention for a long time past and is one of great national importance. It is somewhat singular that this country, foremost as it has always been in matters of engineering enterprise, should be so behindhand in the systematic education of its engineers, there being no establishment in England devoted to that object which is recognised by the profession. Under the system that has been in vogue up to a comparatively recent period a youth intended for an engineer is taken from school at the age of sixteen being thereby deprived of the most valuable years of his education, and placed in some engineering manufactory, where he remains, perhaps, till he is twenty. In those four years his so-called "training" consists in going through the manual routine of the various workshops and "picking up" what knowledge he can by keeping his eyes open and living on good terms with the workmen. His last year is usually spent in the drawing-office, where, by a similar process of "picking up," he learns how to draw if not to design machinery or works of construction. At the end of that time his education is supposed to be complete, and he either remains as a draughtsman until something better is offered him, or he enters the office of another engineer for the purpose of improvement. All this time the far more important theoretical training is neglected altogether, no classes or examinations are held, no lectures or other instructions are given, and though some few energetic young men in some way make up this loss by private study they are a great exception, and the hours of manual work are usually so heavy (from 6 A.M. till 5 P.M.) as to render working in the evening both fatiguing and unprofitable.

The Continental system goes to the other extreme, teaching the theory and discarding the practice. This system is as bad as the other, for experience has shown that in engineering works a practical man without scientific training seldom makes such serious blunders as a scientific man without practical experience. It can only be by a judicious combination of the two systems, allowing science and practical experience to work hand in hand together in the education of an engineer that the best results can be looked for, and in these days of close competition, not only between man and man, but between country and country, it is of the utmost importance to a nation that its engineers should be instructed upon the best and soundest principles. The Indian Government recognised this when it established the Royal Indian Engineering College at Cooper's Hill for the systematic training of engineers for the Public Works Department of India; and it is remarkable that the profession of engineering should stand alone in England as having no recognised *Alma Mater* of its own. Many years ago an engineering college was established at Putney upon a good system, but it was badly managed, and after becoming a nuisance to the neighbourhood, was ultimately shut up; at the present time, with the exception of the technical classes at the Crystal Palace and at King's College, which, in a small way, are doing good work, there is no institution in this country devoted to the education of engineers.

While England is so far behindhand in this important question, a great work has been done by the Japanese Government in the establishment of an Imperial College of Engineering at Tokai, an institution which gives to its students a highly scientific training, combined with actual practical experience in engineering workshops which give employment at the present time to over three hundred workmen, but which are being largely increased and are turning out all classes of engineering work.